

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Energetics of Chemical Processes		Code 1010702111010712576
Field of study Chemical and Process Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Chemical Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: 1		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: Prof. Andrzej Lewandowski email: e-mail: andrzej.lewandowski@put.poznan.pl tel. tel. 061 665 23 09 Wydział Technologii Chemicznej ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	W1- have a basic knowledge of thermodynamics, engineering and chemical technology obtained during the first-cycle studies
2	Skills	U1-the ability to use mathematical calculations and problems in physics to calculate the physicochemical
3	Social competencies	K1-The student is aware of the need to further expand their competences
Assumptions and objectives of the course: -To provide students with the methods necessary to manage the flow of energy in chemical processes		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has an extended knowledge of energy and how it flows - [K_W03]		
2. The student has the knowledge to manage the flow of energy in chemical processes - [K_W03]		
Skills:		
1. Can obtain information from literature, databases and other sources, able to interpret the information and draw conclusions and formulate opinions - [K_U01]		
2. Can formulate and solve complex tasks associated with the flow of energy in chemical processes - [K_U09]		
3. Able to work independently and in a team; know how to estimate the time needed for the resulting task - [K_U02]		
Social competencies:		
1. The student is aware of their responsibility in teamwork, . demonstrate a proactive stance in the team, student successfully fulfill his assigned duties - [K_K05]		
Assessment methods of study outcomes		
-Lecture ? oral exam or study on a selected topic.		
Project ? preparation of the project		

Course description		
<p>-Power of a chemical reaction. The energy exchange. Provides the necessary energy to the low energy of compounds in the synthesis. Photochemistry. Photosynthesis. Supplying energy in the form of work. Draining and development of energy exothermic reactions. High temperature processes (metallurgy, ceramics, electrolysis aluminum). High-energy compounds. Fuels. Liquefaction and gasification of solid fuels. Oxidants. The energy loss in the conversion of fuel. Combustion of high and low temperature. The waste heat. Co-generation of heat and work. Heat accumulators, batteries 'cold'. Accumulation of electric energy</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. J. Szarawara, Termodynamika chemiczna stosowana, WNT, Warszawa 2007 2. E. Grzywa, J. Molenda, Technologia podstawowych syntez chemicznych, WNT, Warszawa 2000 3. R. Dylewski, W. Gnot, M. Gonet, Elektrochemia przemysłowa, Wydawnictwo Politechniki Śląskiej 1999 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. R.S. Berry, S.A. Rice, J. Ross, Physical Chemistry, Oxford University Press, 2010 		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation of the project	24	
Student's workload		
Source of workload	hours	ECTS
Total workload	57	2
Contact hours	33	1
Practical activities	32	1